

Appln No. 10/712,364

Amdt date June 3, 2005

Reply to Office action of March 22, 2005

REMARKS/ARGUMENTS

Claims 1-15 are pending in this application, of which claims 1, 7 and 15 are independent. Claims 1-9 has been amended for clarity purposes and not for reasons of patentability. Claims 10-15 have been added. The amendments and new claims add no new matter and find full support in the application as originally filed. In view of the above amendments and following remarks, Applicant respectfully requests reconsideration and a timely indication of allowance.

Rejections Under 35 U.S.C. § 102(b)

The Examiner has rejected claims 1-9 under 35 U.S.C. § 102(b) as allegedly being anticipated by Mulligan (U.S. Patent No. 6,838,299). Applicant respectfully traverses this rejection.

Claim 1 is directed to a substrate machining method for machining a substrate, comprising: "cutting the substrate through a first surface by use of a rotating disk-like blade to produce a cut surface; and irradiating with a laser light an edge of the cut surface of the substrate."

Mulligan teaches using a laser to "ablate away two trenches (first trench 118 and second trench 118')" (col. 4, lines 15-35.) After the formation of the trenches 118/118', "a wafer saw 117 (see FIG. 6) cuts a channel 126 between the first trench and the second trench 118', through the interconnect layer 108, and through the semi-conductor wafer 114, as shown in FIGs. 7 and 8" (col. 5, lines 22-30.) As such, in the process taught by Mulligan, the laser and the saw do need even contact the same area. Whereas in the claimed invention, a blade produces a cut

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surface in a substrate and a laser irradiates an "edge of the cut surface of the substrate" which is formed by the blade. Consequently, Mulligan does not anticipate claim 1.

Claim 7 is directed to a substrate machining apparatus for machining a substrate, comprising: "a disk-like blade that is rotated to cut the substrate through a first surface to produce a cut surface; and a laser light irradiating portion for irradiating a laser light to the portion of the cut surface of the substrate formed by the blade."

Mulligan does not disclose, teach or suggest "irradiating a laser light to the portion of the cut surface of the substrate" which is formed by the blade as specified by claim 7. Consequently, Mulligan does not anticipate claim 7.

Claims 2-6 depend from claim 1. Claims 8 and 9 depend from claim 7. Claims 1 and 7 are now believed to be in condition for allowance over Mulligan. As such, Applicant submits that claims 2-6, 8 and 9 are also allowable over Mulligan as being dependent from an allowable base claim and for the additional limitations they contain therein. Accordingly, Applicant respectfully requests that the rejection of claims 1-9 over Mulligan under 35 U.S.C. § 102(b) be withdrawn.

New Claims

New claims 10-15 have been added. Each of claims 10-14 depend from either claim 1 or 7. Applicant respectfully submits that claims 1 and 7 are in condition for allowance over Mulligan. As such, Applicant submits that claims 10-14 are also in condition for allowance over Mulligan as being dependent from

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an allowable base claim and for the additional limitations they contain therein.

For example, claims 10 and 13 each recite use of a laser to irradiate an edge of the cut surface "until the edge of the cut surface melts." The laser in Mulligan is used to cut an interconnect layer 108 to form a trench 118. The claimed laser in claims 10 and 13 is for melting an edge of a surface that has already been cut. As such, for this additional reason, claims 10 and 13 are in condition for allowance over Mulligan.

Claim 11 depends from claim 10 and further recites "allowing the melted cut surface to cool and harden thus forming a stronger layer than a remainder of the substrate." The laser in Mulligan is used to cut an interconnect layer 108 to form a trench 118. Thus, instead of using a laser to harden the cut surface as claimed in claim 11, Mulligan teaches using a laser to dissolve a surface. As such, for this additional reason, claim 11 is in condition for allowance over Mulligan.

Claim 15 is directed to a substrate machining method for machining a substrate, comprising: "cutting the substrate through a first surface by use of a rotating disk-like blade to produce a cut surface; and irradiating with laser light an edge of the cut surface of the substrate."

Mulligan does not disclose, teach or suggest "irradiating laser light an edge of the cut surface of the substrate" which is formed by the blade as specified by claim 15. Consequently, Mulligan does not anticipate claim 15.

In view of the above amendments and remarks, Applicant respectfully submits that claims 1-15 are in condition for

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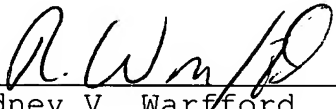
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allowance, and a timely indication of allowance is respectfully requested. If there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By 
Rodney V. Warfford
Reg. No. 51,304
626/795-9900

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